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High-resolution photoinduced transient spectroscopy of defect centers in epitaxial silicon irradiated with high proton fluences

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High-resolution photoinduced transient spectroscopy (HRPITS) has been used to imaging defect structure of n-type epitaxial layers using as active layers of pad detectors irradiated with 24 GeV/c protons. The effect of increasing fluence from 1.0x10ˆ16 cmˆ-2 to 1.7x10ˆ16 cmˆ-2 on parameters and concentrations of radiation defect centers in standard and oxygenated epilayers has been studied. In the former, the predominant defect centers with the activation energies of 315 and 420 meV are proposed to be related to multivacancy-oxygen and self-interstitial-oxygen complexes, respectively. In the latter, the predominant defect center with the activation energy of 420 meV is found to be attributed to the divacancy V2 (-/0).

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